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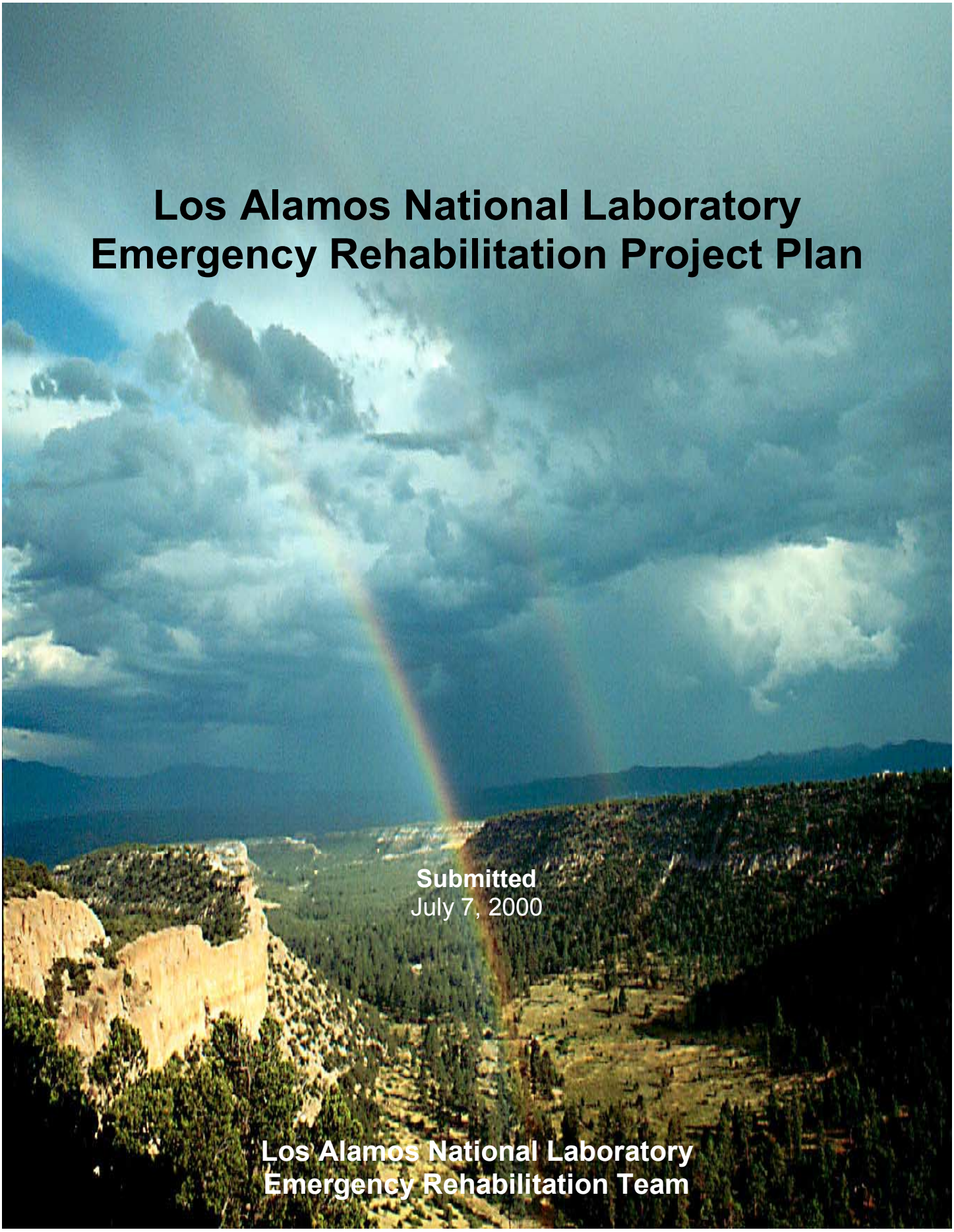

Los Alamos National Laboratory
Emergency Rehabilitation Project Plan

Submitted
July 7, 2000

Los Alamos National Laboratory
Emergency Rehabilitation Team

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Approved for Release

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Richard Burick, Project Director

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Mike Baker, Project Leader

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ACRONYMS

BAER	Burned Area Environmental Rehabilitation
BMP	Best Management Practice
D&D	Decommissioning and Decontamination
DOE	Department of Energy
EPA	Environmental Protection Agency
ER	Environmental Restoration
ERP	Emergency Rehabilitation Project
ERT	[LANL] Emergency Rehabilitation Team
ISM	Integrated Safety Management
LANL	Los Alamos National Laboratory
NEPA	National Environmental Protection Agency
NMED	New Mexico Environment Department
NPS	National Park Service
PRS	Potential Release Site
SSC	Structure, System, or Component
SWEIS	Site Wide Environmental Impact Statement
QA	Quality Assurance
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
USQ	Unresolved Safety Question

1.0 INTRODUCTION

1.1 CHARTER

The Emergency Rehabilitation Project will:

- Evaluate and estimate the impacts from the Cerro Grande Fire.
- Design appropriate mitigation measures for fire, increased runoff and potential flood conditions.
- Implement these measures to prevent further damage to people, property, and the environment.

The Project was initiated on June 1, 2000 and will complete near-term rehabilitation activities by September 1, 2000. Additional projects or project phases are planned for the execution of mid to long-term rehabilitation objectives and the maintenance of the measures initially implemented. These efforts are documented in the FMU-80 Contingency Plan, ERP-EI-PLAN-003, which details the overall strategy for maintaining operational readiness after flood events, and in subsequent project plans under development for future phases.

1.2 BACKGROUND

In May 2000, the Cerro Grande fire burned across upper and mid-elevation zones of several watersheds that have multiple facilities in middle and lower stream reaches. Streams draining watersheds, which have been impacted by the fire, will greatly increase runoff response to storm events and have potential to affect highways 4, 30, 501, 502, 565, and multiple facilities, utilities, and potential release sites (PRSs) on Los Alamos National Laboratory property. The fire has also increased potential sediment delivery to the downstream Rio Grande and Cochiti reservoir.

1.3 PROJECT OBJECTIVES

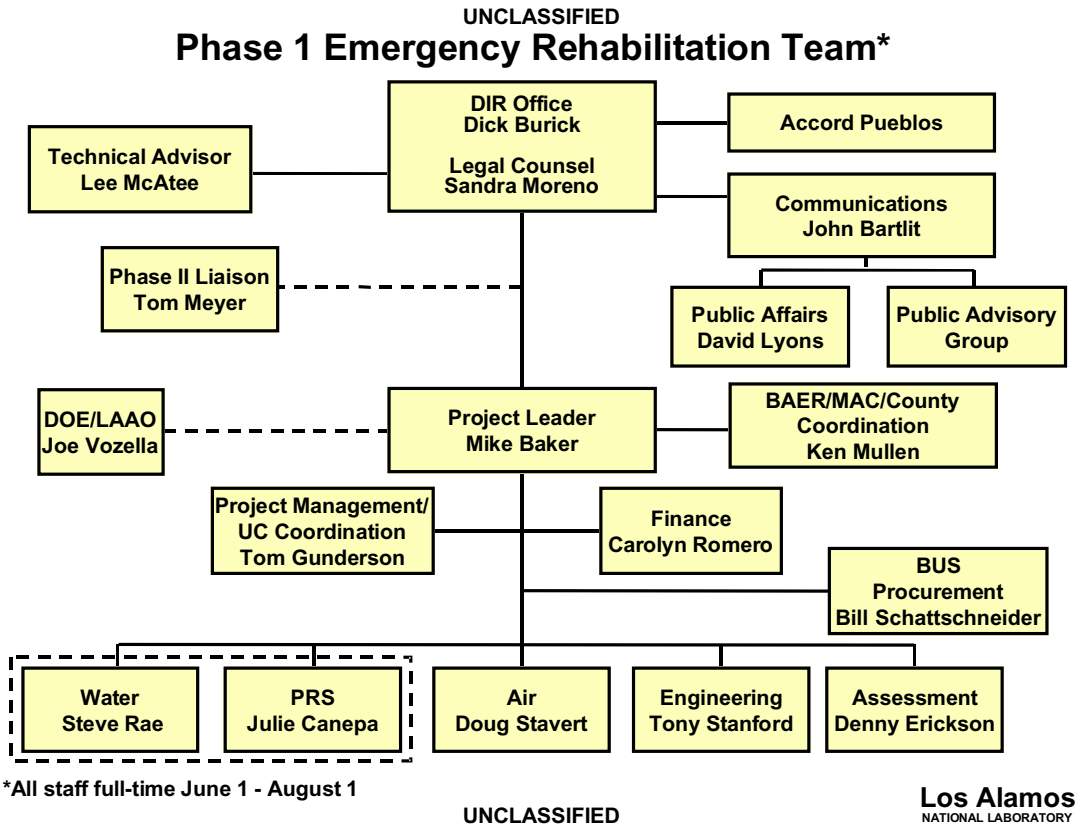
The four main objectives of the ERP, in order of importance, are:

1. The safety of workers and the public
2. The control of off-site transport of contaminants
3. The protection of physical assets including Laboratory structures, utilities, roads and other assets
4. The rehabilitation of Laboratory watersheds

1.4 PROJECT DIRECTION

Dick Burick, Deputy Laboratory Director for Laboratory Operations, has been designated the Project Director for the Emergency Rehabilitation Project by John Browne, Director, LANL. Key personnel have been assigned to the project as shown in Figure 1.

Figure 1. Emergency Rehabilitation Team



1.5 ROLES AND RESPONSIBILITIES

Roles and responsibilities have been well defined for the ERP. Management of the ERP and its activities is through the ERT. The ERT consists of teams from both LANL and the USACE, working jointly in support of DOE, to complete the scope of this project. Specific assignments are detailed in the internal project management schedule maintained in the ERP office.

LANL uses a matrix approach to staff its team. A few key personnel are deployed full-time to manage the ERP, while technical resources and project capacity are pulled, as needed, from various divisions of the LANL functional organization. These borrowed employees are used on an as-needed basis to augment the project management staff, and provide both general and LANL-specific core competencies to the ERT.

1.6 DECISION MAKING

Decisions are needed through the life of the ERP, and are categorized into two main areas technical, and business. Technical decisions involve the choice of sub-project alternatives, the need for additional or supplemental data, sampling, or analysis, and engineering and construction methods choices. Focus Area leads are responsible for making decisions in their respective areas. Technical decisions that involve more than one focus area are the responsibility of the

Project Leader. Major technical direction and decisions will be the responsibility of the Project Director.

Business decisions include both those decisions essential to the operation of the organizational infrastructure as it pertains to the ERP, such as defining project parameters and allocating institutional resources, and those that are project specific, including prioritization of activities, acquisition of key technical experts and support resources, collaboration with other federal, state and local agencies, and determination of the acceptable level of organizational risk. The Project Director has the responsibility for these decisions.

2.0 PROJECT INTEGRATION

2.1 INTRODUCTION

This project will be implemented following accepted LANL and DOE project management policies and procedures according to project-specific plans. This includes the development and execution of this project plan and the institution of formal change controls to ensure that scope is defined, priorities are set, and commitments are met.

Integration activities include coordination with external agencies, Accord Pueblos and the public. Internal project integration consists of focus area coordination and resolution of site-wide issues through an approved communications plan.

2.2 EXTERNAL AGENCIES/ACCORD PUEBLOS

LANL is coordinating the ERP with the Accord Pueblos, and federal, state and local stakeholders that are adjacent to or have been impacted by the Cerro Grande fire. This coordination includes the sharing of information and resources, to manage the response to potential flooding and other post-fire effects. These organizations include:

- The four Accord Pueblos
- Department of Energy
- Department of Interior, Park Service
- Department of Agriculture, Forest Service
- State of New Mexico
- Los Alamos and surrounding counties

Integration also includes obtaining technical assistance and input from the New Mexico Department of Health, U.S. Army Corps of Engineers, the Bureau of Reclamation, the New Mexico State Engineer s Office, the Environmental Protection Agency, the New Mexico Environmental Department, and the Federal Emergency Management Agency.

This project includes a Memorandum of Agreement with external agencies in order to rapidly respond to shared problems.

2.3 PUBLIC AFFAIRS

Contained within this project are activities to ensure that the public remains informed of ERP progress on a daily basis. The LANL Public Affairs office is responsible for the dissemination of this information and has appointed a public affairs liaison as part of the project management team.

2.4 INTERNAL PROJECT COORDINATION

The project is divided into six main focus areas. They are:

- Project Management — Responsible for overall coordination and management of the ERP.
- Water — Model flood flows and other parameters, prescribe erosion controls and treatments for burned areas, upgrade storm water gauging and sampling stations, and monitor flood flows and pre/post-flood water quality conditions.
- PRS — Assessment of fire damage and mitigation of fire and flood effects to the potential release sites located on LANL property.
- Air — Monitoring of air quality during execution of rehabilitation work.
- Engineering Implementation— Activities for the design, construction and maintenance of mitigation features implemented to reduce the risks from fire and runoff/flooding from the Cerro Grande fire.
- Assessment — Coordinated topical and integrated assessments as to impacts at the Cerro Grande fire.

Through the coordination efforts of the Project Leader, the ERP will maintain plans, specifications, priorities, and designs and share this information with the focus area team leaders responsible for implementation. In turn, the team leaders will coordinate and communicate project findings, results and status utilizing management tools, such as Plan-of-the-Day Meetings.

2.5 CHANGE CONTROL

There are two primary reasons for utilizing a formal change control process for the ERP:

- Project changes based on input and findings from project staff and external agencies.
- The need for action to mitigate the effects of summer rains.

This change control procedure is documented in Cost Schedule Controls Criteria, ERP-EI-006.

3.0 PROJECT SCOPE

A six-step development process was utilized in the development of ERP scope. This process generated a set of mitigation activities to be implemented. This process involved:

1. Vulnerability assessments

2. Brainstorming of alternatives
3. Down-selection of alternatives using, as appropriate, LANL staff, external stakeholders, and experts
4. Feasibility assessments of selected alternatives
5. Final alternative selection
6. Detailed engineering

For potential release sites, the vulnerability assessment phase included detailed field assessments of all sites, and a determination of impacts based on field conditions, sampling, and analysis.

A coordinated sampling and monitoring program will be conducted to assess impacts on air; external radiation; storm, surface, and ground water; sediments; soils; cultural and biological resources; ash and biota. The program will involve Los Alamos National Laboratory, Department of Energy, New Mexico Environment Department, Environmental Protection Agency, United States Geological Survey and the United States Army Corp of Engineers. The program will maintain consultation with the Accord Pueblos, the County of Los Alamos and the National Park Service.

All alternatives will be considered and engineered based on water-modeling information. This important activity will result in the following products:

1. Runoff flow calculations for all impacted watersheds
2. Cross-sections at selected areas for facility/utility protection determinations
3. Flow depth, height, and flow-rate calculations for input to runoff sedimentation control designs
4. Sedimentation information for use in contaminant transport mitigation

The ERT has identified a set of sub-projects to accomplish the objectives of the ERP. These sub-projects, the responsible parties, and their status are provided in overview in Table 1: *Selected Alternatives*. Summary scope descriptions are provided in this project plan. Detailed scope descriptions have been developed for sub-projects that are currently being implemented. The detailed scope descriptions, design specifications, and drawings are controlled within the ERP office.

To document the efforts of the fire and subsequent mitigation activities, a SWEIS Yearbook supplement will be developed and published. This document will compare SWEIS Accident Analyses with consequences for the Cerro Grande fire, review NEPA-based analysis and bounding conditions, document mitigation and summarize effects and damage. In addition, the DOE and LANL will prepare a Special Environmental Analysis of the emergency actions taken in response to the suppression and consequences of the fire.

For reference, see Figure 2 for a general view of the locations of canyons referenced in this document.

Figure 2. Canyons of Los Alamos, NM

Table 1: Selected Alternatives **** MAJOR CIVIL PROJECTS**

	Action	Responsible Party	Status
Site-Wide			
	GENERAL		
	Contingency Planning — Develop site wide contingency plans for pre-rain and post-train compensatory actions.	LANL	Underway
	Upper Watershed Reforestation — Implement normal burned area rehabilitation in high and moderate burn areas to include USFS tree-felling, contour raking and reseeding (on LANL/USFS property)	LANL	Underway
	Maintenance, Monitoring and Surveillance — Develop, implement and document a program to routinely inspect all run-off/flood mitigation features (e.g. culverts, retention basins, wellhead protection, etc.). Monitor conditions as weather events occur, conduct field surveillance activities to verify systems performance.	LANL	Underway
	Hydroseed/mulch in steep-slope burn areas — Coordinate hydroseeding/ mulching of steep-slope, severe burn areas on LANL property with adjoining property holders. Upon concurrence, implement hydro-seeding/mulching of LANL, Santa Clara Pueblo, and US Forest Service property under a National Park Service contract, to streamline mitigation activities and reduce overall costs.	LANL	Underway
	Health effects analysis — Using existing data, models, and baseline environmental conditions information, study and report on health effects based on the Cerro Grande fire and mitigation efforts of the ERP.	LANL	Underway

Table 1: Selected Alternatives (cont.)

	Action	Responsible Party	Status
	Air Monitoring - The air quality impacts from the Cerro Grande Fire will continue to be analyzed, validated, documented and communicated. Independent validation of air quality measurements and data will occur when feasible by the New Mexico Environment Department Oversight Bureau, or Air Quality Bureau. Special air quality monitoring projects will be done when assessment of site specific sources show increased potential risk to the public or workers. These sites may include remediation projects at contaminated areas, removal of structures or soil movement projects.	LANL	Underway
	Harden Critical Utilities and Roads. Identify all utilities (e.g., gas, water, electric, radioactive waste, sanitary, communication, etc.) that may be impacted by run-off/erosion and document in database. Review each impacted utility and determine risk to Laboratory and need for hardening or compensatory measures. Install hardening for at-risk utilities in accordance with approved engineering details.	LANL	Underway
	Removal of Hazardous Material. Identify at-risk hazardous and radioactive material at facilities within the projected flood plane. Dispose of and/or relocate materials as necessary to remove from danger of flood and environmental contamination.	LANL	Underway
	PRS		
	Evaluate Cerro Grande fire impacts on all known PRSs on LANL property. Categorize severity of impact and plan BMP efforts to mitigate fire damage. Determine vulnerabilities and assess potential remedies.	LANL	Underway

Table 1: Selected Alternatives (cont.)

	Action	Responsible Party	Status
	Install jute matting, erosion control, and other BMPs on PRSs impacted by the Cerro Grande fire. Protect PRSs from potential flood erosion using BMPs.	LANL	Underway
	CONTAMINATION MIGRATION MITIGATION/EROSION CONTROL		
	Protect wellheads. Identify all environmental and drinking water wells that may be impacted by run-off erosion. Harden all potentially impacted wellheads in accordance with approved engineering details.	LANL	Underway
	Evaluate selected sediment removal in canyons. Evaluate environmental data in context of flood predictions to recalculate the risk to human life from the off-site migration of contaminants and identify contaminated sediments that may be selected for removal. Provide risk reduction options, regardless of risk levels, to include removal of contaminated sediments if warranted. Where removals are identified, provide field markings of sediment areas and estimate sediment volume to be removed. Determine access, cost estimate and schedule for removal. Provide in-field verification of contaminant locations, and erosion control around removal sites to protect from flood erosion, as needed.	LANL	Underway
	Conduct laser altimetry (LIDAR) surveys to assess erosion and deposition resulting from floods.	LANL	Underway
	Collect environmental data on sediment, surface water, and alluvial groundwater to characterize pre-flood baseline conditions and follow with post-flood characterization to evaluate flood impacts.	LANL	Underway

Table 1: Selected Alternatives (cont.)

	Action	Responsible Party	Status
	Prepare to measure flood hydrographs and collect environmental samples from flood waters at gauging stations located throughout the Laboratory.	LANL	Underway
	Analysis of water flows and sedimentation. Develop cross-sections and model projected flood flows and sedimentation loads for use in engineering flood control measures.	LANL	Underway
Water Canyon			
	Evaluate need for sediment trapping in Water Canyon.	LANL	Underway
	Water Canyon/*US 501*— Harden the US 501 crossing.	IT/USACE	Design
Canon De Valle			
	MDA R Fire Suppression. Utilize accepted fire suppression techniques and excavate smoldering debris to extinguish remaining fire. Excavate smoldering debris at MDA R with remote operated backhoe. Continue to monitor air quality impacts from excavation activities for volatile organic compounds, metals and radionuclides.	LANL	Complete
	Evaluate need for sediment trapping in Canon de Valle.	LANL	Underway
	Canon De Valle/*US 501*— Harden the US 501 crossing.	IT/USACE	Design
Pajarito Canyon			
	Pajarito Canyon/*US 501* — Harden the US 501.	IT/USACE	Design
	Two-Mile Canyon/ *US 501* — Harden the US 501 crossing .	IT/USACE	Design

Table 1: Selected Alternatives (cont.)

	Action	Responsible Party	Status
	Pajarito Canyon at Anchor Ranch Road — Harden the Anchor Ranch Road crossing at Pajarito Canyon	IT/USACE	Design
**	*Two-Mile Canyon at Anchor Ranch Road* — Construct a spillway on the right abutment of and a seepage/stability berm downstream of the abandoned land bridge; seal the upstream face of the abandoned land bridge.	USACE	Underway
**	*Pajarito Flood Retention Structure* — Construction of a flood retention structure across Pajarito Canyon, above TA-18. Construction — 30 to 40 days.	USACE	Design
**	*TA-18 Flood Protection Diversion*. Install sheet pile barrier around Kiva 1. Harden/modify road box culvert and cable raceway to accommodate run-off. Protect historic cabin.	LANL	Design
	Pajarito Road Crossings	LANL	Under Consideration
	Weirs — Construct low head weirs in lower reaches of Pajarito Canyon	USACE	Under Consideration
Mortandad Canyon			
	Weirs/*Sediment Traps* — Construct low head weirs in lower reaches of Mortandad Canyon; restore capability of existing sediment traps, if warranted.	USACE	Under Consideration
	Clean existing upper Mortandad Canyon sediment traps.	LANL	Under Consideration

Table 1: Selected Alternatives (cont.)

	Action	Responsible Party	Status
Los Alamos Canyon			
	Los Alamos Canyon Reservoir Dam - Reinforce the crest and downstream slope of the dam; construct downstream energy dissipaters, protect the left abutment with a training dike and install upstream wire rope debris nets.	USACE	Design
**	*Flow diversion through TA-02/41*. Design and construct flow barriers, channels, etc. to route water around TA-02 and TA-41 with minimal damage to structures. Remove utilities, access bridges, fences, etc. as necessary to facilitate flow	LANL	Underway
**	*D&D of Selected Structures*. Remove cooling tower, surge tank, and other contaminated structures at TA-02.	LANL	Underway
	Sediment Removal — Remove selected sediments in Los Alamos Canyon to reduce risk of contaminated sediments moving off-site.	LANL	Underway
	Weirs — Construct low head weirs in lower reaches of Los Alamos Canyon.	USACE	Design
Pueblo Canyon			
	Land Bridge	LA County	Design
	Weirs — Construct low head weirs in lower reaches of Pueblo Canyon.	USACE	Design

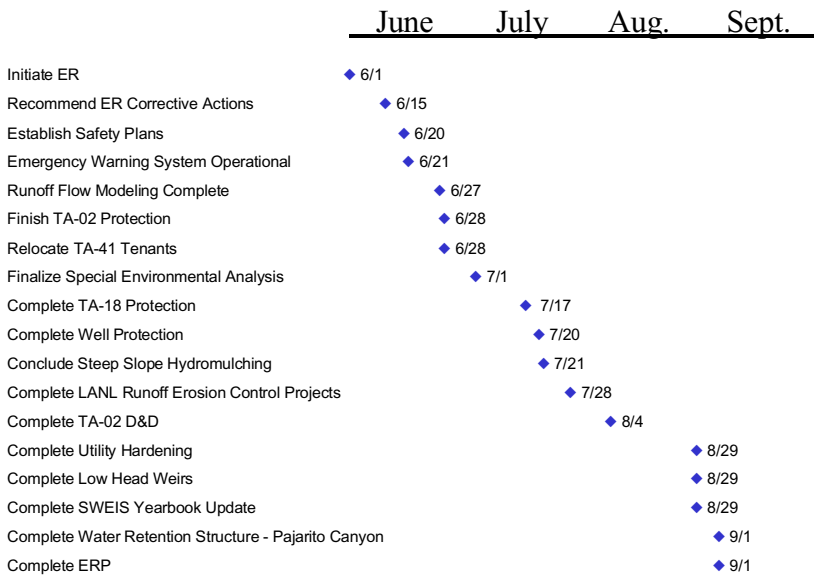
4.0 PROJECT TIME AND COST

4.1 TIME

The ERP is a schedule-driven project, based on the need to meet project objectives within a very restrictive timeframe.

In order to complete the ERP by the September 1, 2000 end date, multiple, parallel activities are planned. A summary of major milestones is shown in Figure 3. Three to five hundred (300 — 500) scheduled activities will be planned and managed using accepted project scheduling techniques and will be maintained in the ERP Office. These activities will be assigned to project personnel and are organized by canyon to track parallel activities occurring on the project. The schedule will be revised by following the change control procedure, as needed.

Figure 3. Major ERP Milestones



4.2 PROJECT FUNDING

4.2.1 Planned Costs

Prioritization of sub-projects within the ERP will allow for management decisions that are responsive to funding constraints. As part of the prioritization, cost estimates are required to determine overall project budget needs and to support funding requests. Cost estimates have been developed as part of the initial planning phase. These estimates are preliminary, and will be refined as engineered alternatives are selected and as more specifications and product descriptions are developed. Subject to change control procedures, new estimates will be initiated for work not previously planned.

4.2.2 Actual Costs

Actual costs will be tracked utilizing an ERP-specific project cost coding structure. This information will allow for cost performance measurements to ensure the project remains within budget and that cost commitment thresholds are not exceeded. The established LANL cost charging system will be utilized. As work orders, invoices, and timesheets are executed, costs are tallied against the ERP Work Breakdown Structure. Reports will be provided to ERP managers that compare planned versus actual costs.

5.0 PROCUREMENT

Selection of engineered alternatives will be constructed through the life of the ERP. This includes utility hardening, construction of sediment basins, channels and retention areas, removal or protection of facilities, and other subprojects as required. Although many of these subprojects can be completed by the Laboratory subcontractor, Johnson Controls Northern New Mexico (JCNNM), the need to run concurrent projects may necessitate procurement of outside contractors.

Procurement will follow established LANL policies and procedures, and will be expedited through the use of an ERP dedicated procurement team. Emergency rehabilitation conditions may warrant sole-source selection of contractors if time does not permit the use of competitive bidding procedures. In all cases, proper procurement documentation procedures will remain in place and appropriate signature authority, negotiations, audits and cost reconciliation will occur.

6.0 PROJECT QUALITY MANAGEMENT

The products from this project will be managed in accordance with LANL quality procedures, the LANL Environment, Safety and Health and Environmental Restoration quality assurance programs, and the project-specific quality assurance plan ERP-EI-PLAN-001, Quality Management Plan. Highlights of this plan include:

- Assessment and analysis following sound scientific principles, DOE Orders, environmental laws and regulations, and LANL approved procedures.
- Engineering design in accordance with project specific design criteria. (ERP—EI-002, *Design Criteria for Engineering Implementation Mitigation*).
- Construction following technical requirements and standards that include the USQ process and any updates to existing authorization bases.

In addition, this Project will utilize a formal peer review process to verify and validate (where appropriate) scientific analyses, models, environmental data and conformance to design and construction specifications. This peer review process will be further documented in Peer Review Process for the Emergency Rehabilitation Project, currently under development.

7.0 COMMUNICATIONS

Quality communications throughout the ERP are critical to the success of this schedule-driven project. Rehabilitation activities will occur throughout the laboratory, involve multiple agencies, and require in-the-field changes in response to changing conditions. Most importantly, safety of the rehabilitation workers requires infallible communications.

Communication to surrounding communities and the news media must also be consistent, reliable and timely. Due to these complex communications issues, the ERT has developed a project-specific communications plan. This plan delineates all levels of communications required for successful completion of the project.

In addition, a Meteorological Flood Warning System was developed in cooperation with the Laboratory meteorology group (ESH-17), the National Weather Service, Bureau of Land Management and Los Alamos (LA) County to facilitate worker and public safety. This system will alert Los Alamos County Police Department and the Laboratory Emergency Operations Center staff of potential adverse thunderstorm cell development and high rates of rainfall in the burned areas, allowing individuals in affected areas additional time to vacate.

The ERT has also developed contingency plans to communicate information in the event of a severe weather event, such as flooding. These plans also outline contingency actions required to restore LANL infrastructure (utilities, roads, etc.).

Internal project communications consist of daily project updates, performance reporting, information distribution, and administrative closure. These activities will be managed in accordance with LANL project communications guidelines and are important to the safety of the project team.

The ERP will utilize existing LANL document control procedures to facilitate formal communication and maintain records of project decisions, timelines and events.

8.0 RISK MANAGEMENT

Risk management involves the identification, quantification and mitigation of risk events. The very nature of the ERP is the mitigation of potential risk impacts to LANL and its resources from post-fire precipitation. These risks include:

1. Threats to the safety of workers and the public
2. Public, worker and environmental health
3. Off-site transport of contaminants
4. Damage to physical assets including Laboratory structures, utilities, roads and other assets

While the total impacts of these potential risk events cannot be fully predicted, water-flow modeling results suggest that the expeditious implementation of efforts to reduce the flow-rate and quantity of off-site run-off will reduce the

impacts of these risks. As a result, ERT has fast-tracked the implementation of the most appropriate mitigation efforts to realize their affects prior to the heavy precipitation events that are expected by early July 2000.

The ERT seeks to minimize risks during the implementation of ERP mitigation efforts by implementing risk management in the following areas:

- *Worker safety.* Development of communication plans to mitigate worker risk and contingency plans for safe mitigation after a catastrophic weather event. In addition, the use of trained personnel and proper safety equipment will be used to reduce the possibility of injury. All activities will be conducted in accordance with the Laboratory s Integrated Safety Management Plan. Each respective focus area will operate under approved Health & Safety (H&S) plans that are specific to each work activity. If unique field conditions exist as a result of the fire (e.g., stump holes), modifications to respective H&S plans will occur to mitigate safety risk.
- *Health Risk*. Conduct/Coordinate risk assessments by establishing threat-driven risks (e.g. fire, flood and erosion), developing at-risk scenarios, projecting impacts, and validating and quantifying risks. Coordinate independent risk assessment with external agencies.
- *Schedule.* Identification of critical path schedule activities and mitigation through human resource management, including double-shift work, additional resources, and dedicated support teams (procurement, work control).
- *Funding.* Mitigation of inadequate or delayed funding involves the development of proper estimates, activity prioritization, and sound fiscal management to plan and track project budgets.
- *Technical risk.* The risks are potential design inadequacies, insufficient environmental data, and incomplete analysis. Mitigation activities will include peer review and use of external agency technical expertise.